

Ontology based semantic data management for pandisciplinary research projects

B. Decker, M. Politze
IT Center RWTH Aachen University
{decker, politze}@itc.rwth-aachen.de

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Abstract:

Research today is increasingly interdisciplinary and it thrives on collaboration with partners at the home institution, at home and abroad as well as between universities, research institutions and industry. Research projects are therefore far beyond the classical model of bilateral cooperation and design themselves as virtual organizations. For their work researchers need a secure space which allows them to cross professional and organizational boundaries within the project context and to exchange and enrich research artefacts. In addition, mechanisms for crossing the project and organizational boundary are required to be able to build on other research results and to make their own results accessible to the public.

ProjectRepository, initially funded by the German Research Foundation, is a web based pandisciplinary repository for research projects that shall become a central component of scientific cooperation in scientific projects at the university. It is developed by IT Center of RWTH Aachen University on basis of Microsoft SharePoint as a widespread standard product for web based communication and collaboration. The product in turn is extended by several features concerning the tagging and formal retrieval of data. These features make use of ontologies to define the structure of the repository.

The main goal of ProjectRepository is to build a web based platform that offers a low-threshold service to share, store and retrieve research data among different groups of researchers from a variety of fields. This service is integrated into the IT infrastructure offered by RWTH Aachen University. Finally, once fully developed, this support for researchers in the field of e-science shall have an equivalent standing as e-learning applications that already exist at the University.

Our approach to accommodate the context of cooperative interdisciplinary research is to combine librarian methodologies for organizing und structuring artefacts like classification and taxonomies with semi structured approaches like tagging. The product should provide a work-flow that enables researchers of different disciplines to structure their research data and map it to an ontology. The ontologies themselves define the structure of the metadata stored and allow multiple enhancements to the currently available structures offered before. Thus the product offers a user interface to the semantic web. Search and collaboration can profit from the formal definition of the ontology. This can be extended to knowledge sharing in the semantic web and through semantic search engines.

The described product therefore offers the following features:

- An interface to store, retrieve and update the ontologies used in the different projects.
- A functionality that adds the structure provided by the ontology to an existing or a new repository.
- Ways of retrieving data using the structural information provided by the ontology.
- An interface that allows multiple repositories to exchange data and meta-data
- Enrich existing data repositories with structured metadata.

The intermediate versions of the product are continuously integrated into the system from the start of the project. The product is designed in cooperation with four groups of researchers of RWTH Aachen University: the University Library, the Institute of Pathology, the Department of History of Urbanization and the Institute of Hydraulic Engineering and Water Resources Management.

The current version will be further improved to provide a low-threshold access method to create and maintain semantic data for a variety of researchers. Our future challenges before finally introducing the product are:

- Build a more seamless integration of ontology creation and handling in the user interface to provide a low-threshold to access the semantic tools.
- Raise usability and acceptance of the system to be to implement it for more research groups at RWTH Aachen University.
- Further integration in the existing IT infrastructure.